dispersed, the Schnebelberg was seen to be shorter by a few metres, and the beautiful wood in the Murgthal has disappeared beneath a huge avalanche of stones and earth.

At the annual meeting of the Council of the Royal School of Mines, the prizes and associateships were awarded as follows:—The Edward Forbes medal and prize of books to H. M. Platnauer. The De La Beche medal to John Greene. The Murchison medal and prize of books to H. M. Platnauer. Associates: Mining and Metallurgical Divisions—E. B. Lindon, P. W. Stuart Menteath, Ralph Scott. Mining Division—John Greene, B. Mott, H. E. Tredcroft. Metallurgical Division—R. S. Benson, J. J. Beringer, D. B. Bird, H. S. Cotton, W. Cross, W. L. Grant, G. S. Grundy, C. L. Higgins, B, McNeill, T. H. Reeks, J. Taylor. Geological Division—H. H. Hoffert, H. M. Platnauer.

The Agricultural Society's show at Carlisle, which was opened on Monday, is said to be unusually successful, so far as the exhibits are concerned.

Mr. P. H. Pepys writes:—"It may interest some of your geological readers to know that a branch canal is now in course of being made from the Grand Junction Canal at a point near the West Drayton Station of the Great Western Railway. This cut, which runs parallel with the Great Western Railway to a point not far from the Slough station, passes through beds of river gravel and brick earth, a very interesting section of which has just been opened up by the excavators."

A sad balloon accident has taken place at Le Mans, and may be referred to as illustrating some useful facts relating to aëronautics. A man named Petit had ascended with two balloons connected by a long rope. The smaller, which was placed above, carried his son, almost a boy; Petit being in the larger with his wife. There was not much wind, and this foolish experiment would have ended without accident if Petit had not forgotten to loosen the neck of the balloon, so that no escape was left for the gas which was gradually expanding. When the balloon arrived at an altitude of 400 to 500 metres it burst in the vicinity of the "equator," and descended with great velocity, dragging the smaller balloon. Petit, who was devoid of any scientific knowledge, supposed his son was in danger, and with true heroism he cut the rope connecting the two balloons when at 250 to 300 metres from the ground. He placed his wife on the ring and remained himself in the car. The shock was so terrible that his spinal cord was broken, and he died on the following day. His wife was very badly hurt, and though in danger, is alive. If Petit had not cut the rope by an act of unintelligent devotion he would very likely have escaped, and his son would not even have touched the ground.

We have received the first two parts of Dr. Braithwaite's "British Moss Flora," published by the author at 303, Clapham Road. We hope to notice the work at length on its completion.

From Dr. Schomburgk's Report on the progress and condition of the Botanic Garden and Government Plantations of South Australia during the year 1879, we gather many interesting facts. First, with regard to the climatic changes, temperature, sunshine, &c., and their effects on vegetation in Adelaide. During the Australian autumn, winter, and spring the country was visited with the most favourable and seasonable weather on record, the influence of such a season had, of course, a wonderful effect on the agricultural and pastoral produce of the colony, the wheat crop, for instance, being one of the most abundant on record. We are told that owing to a "part of the spring months—September and October—being cool and cloudy, and showery, the roses flowered in such perfection as was never witnessed in South Australia. Flowers were seen from five to six inches in diameter. On the subject of forage plants, a subject that has occupied a good deal of attention in our colonies of late, *Cyperus esculentus*, known as the chuffa or earth almond, takes a prominent place. This plant it appears is extensively grown in the Southern States of America, where the tubers are used for feeding hogs, sheep, and poultry. These tubers are said to contain a quantity of air and sugar, and are consequently very fattening to animals fed upon them. Dr. Schomburgk also recommends the cultivation of the Nardoo plant (*Marsilea macropus*, Hook.), which, in the interior of South Australia, where the plant is common, forms a valuable nutritious forage plant. Attention is also drawn to the Tagasaste (*Cytisus proliferus*), a shrubby leguminous plant of the Canaries, the leafy branches of which have a reputation as a useful fodder. Dr. Schomburgk announces the probable early completion of the new Museum of Economic Botany in the Botanic Garden, the cases in which are arranged on the plan "adopted in the new Kensington and Kew Museums." The museum collection already numbers 2,000 specimens, and these are being constantly added to, contributions constantly arriving in very large numbers.

The annual meeting of the Royal Society of New South Wales, Sydney, was held May 12; the number of new members elected during the year is fifty-one, making the total number of ordinary members upon the roll to date, 430. During the year the Society has elected the following gentlemen as honorary members, viz.:—Mr. George Bentham, F.R.S., C.M.G., Dr. Charles Darwin, F.R.S., Prof. Huxley, F.R.S., Prof. Owen, C.B., F.R.S., making the total number of honorary members nineteen. Mr. R. Etheridge, jun., F.G.S., has been elected a corresponding member of the Society. Financially the Society's affairs are in a satisfactory condition. At the Council meeting held on April 28 it was unanimously resolved to award the Clarke memorial medal for 1878 to Prof. Owen; for the year 1879 to Mr. G. Bentham; and for 1880 to Prof. Huxley, for their valuable contributions to the knowledge of the palæontology, botany, and natural history respectively of Australia. During the past year the Society has received 664 volumes and pamphlets as donations, against which it has distributed 523 volumes and pamphlets. The honorary secretaries are Prof. Liversidge and Dr. Leibius. At this meeting Sir Joseph Dalton Hooker was elected an honorary member.

METEOROLOGICAL NOTES

Prof. Nipher has sent us the *Missouri Weather Service Report* for April, 1880, and the *Daily Times* of St. Louis of May 4, in both of which publications interesting and valuable details are given of the tornadoes which desolated Marshfield, and were attended with disastrous results at other places in their route through the south-west of the State of Missouri. The details were collected with great labour and care, Professors Nipher and Shepard, Judge Barker, and Messrs. Smith and Kribben having spent four days in the saddle, from the 22nd to the 26th, in collecting the evidence of eye-witnesses and examining the effects produced by the tornado. The Marshfield tornado was one of three whirlwinds which occurred in this part of Missouri, separated only by short intervals of time. The most violent of these began near the south-west corner of the state, and thence swept up the Finley Creek Valley. The width of its path exceeded a mile at points, and over this breadth even oak saplings were torn out by the roots, and either thrown out of its path or laid down in rows in the lee of ridges. The average width of its destructive path for a distance of 100 miles was 3,000 feet, thus covering an area of 60 square miles. The Marshfield tornado originated about half an hour earlier and at a point a little to northward, slightly diverging from the path pursued by the previous tornado. Though less violent, considered as a whole, it proved much more destructive to life, no fewer than sixty persons being killed in the town of Marshfield, that town itself being wholly destroyed. The destructive path of this tornado was about 45 miles in length, and as its average breadth was about 1,500 feet, it covered an area of 13 square miles. This storm

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has been successfully traced to its origin in a harmless dust whirl generated between two currents of air which met in such a way as to produce a whirl in the opposite direction to the hands of a watch, the air at the same time along its subsequent path being oppressively warm and moist. The third tornado occurred about the same time, and passed to the north-east, near Jefferson City. The area covered by these three tornadoes is about 80 square miles, and more than 100 persons lost their lives. Many interesting points were noted by Prof. Nipher and his staff of observers. Almost all the trees blown down were thrown down in the line of the tornado track, and the lane of prostrate trees lying in the line of the storm's path was continued across sparsely wooded tracts, where, consequently, the destructive lane was formed, not by the trees falling on each other, but by each tree being overturned by the violence of the gust. One of the observers, Mrs. Lenz, reports that the whirlwind cloud seemed to be of a circular or wheel shape, dark and heavy on its edges, and white or more like an ordinary cloud in the interior; her description being that it looked like a coiled snake whirling round and round a white centre. In this connection an additional observation was made by another observer, Mr. Steel, to the effect that the bottom of the cloud-funnel seemed to sway somewhat, as well as to move up and down; it looked like dark smoke, and he could occasionally see up into the funnel, which seemed to be hollow, the inside appearing to be lighter coloured than the outside. It is much to be wished that future observers who may be so circumstanced as to be able to observe this feature of whirlwinds would endeavour to note the motions, whether upward or downward, in the interior and on the outside of the funnel, accurate observations on this point being of supreme importance in arriving at a correct knowledge of whirlwinds. It was also noted that trees were stripped of their bark only where the ground was covered with *débris*, and the barking was confined to the sides of the trees exposed to the flying missiles. It is a singular circumstance that along the whole path of the tornado not a single flash of lightning was observed.

In the *Missouri Weather Service Report* referred to above the tracks of these tornados are laid down on the map accompanying the report, and it is in this part of the State that the rainfall of the month was greatest, the maximum of 8·00 inches being at Verona, which is situated near the point where the tornadoes originated. The rainfall over the southern portion of the State equalled five inches, and the amount diminished on proceeding northward. The minimum amount was recorded along the northern slopes of the Missouri valley, the least fall being 1·07 inch at Glasgow. The mean temperature was 58°·7 at St. Louis, or 2°·6 in excess of the average of April. A general and severe fall of temperature followed the storms of the 18th, when snow fell at Oregon, Palmyra, Neosko, and Greenfield.

We are indebted to Mr. W. A. Dixon, Sydney, for a communication on the meteorology of a guano island, originally made by him to the Royal Society of New South Wales. The island referred to is Malden Island, in 4° 2′ S. lat. and 154° 58′ W. long.; it is triangular in shape, of purely coral formation, and comprising a land area of little over 10,000 acres. The climate of the island, though near the equator, and sometimes having the north-east and sometimes the south-east trades, is generally characterised by extreme dryness. Mr. Dixon resided in Malden Island two and a half years, dating from October 13, 1866, when the following amounts of rain were collected:—In November, 1866, there fell 0·50 inch; in 1867 there fell in September 0·26 inch; October, 0·23 inch; November, 0·63 inch; and December, 0·19 inch; in all, 1·31 inch in twelve days. In 1868 there fell in January 0·69 inch; February, 0·002 inch; March, 0·17 inch; April, 0·19 inch; May, 0·56 inch; June, 0·12 inch; July, 3·82 inches; August, 0·87 inch; September, 0·11 inch; October, 2·89 inches; November, 0·77 inch; and December, 3·46 inches; in all, 13·60 inches in fifty-two days. In 1869 the rainfall was in January, 12·73 inches; in February, 4·83 inches; and March, 2·77 inches; for the three months, 20·33 inches in twenty-eight days. On January 28–29, 1869, there fell in eight and a half hours 4·57 inches of rain. It was often noticed in the daytime that whilst it rained heavily over the ocean all round the island the moisture-laden clouds from the east disappeared as they drifted over the island, and no rain fell. As regards temperature, the variations of the thermometer in shade were extremely regular. At daybreak it stood at 80°, when it gradually rose to 96° between 9 and 10 a.m., about which point it stood till shortly after sunset, when it began gradually to fall to 80° at 10 p.m., remaining near this point till morning. From January 16 to 29, 1869, the temperature did not rise above 82°, there being continuous rain, and no sun visible, for thirteen days, with the wind due west. An unblackened thermometer frequently exposed to the sun was never observed to rise above 106°·0, but, covered with one inch of light grey soil, it rose to 135°·0. Evaporation was observed at irregular intervals; an average of eight days ending December 11, 1868, gave 0·387 inch per day. In the beginning of October the wind was generally light east, with calms; and the north-east trades began about the middle of the month, varying from east to north-east till the end of February, when light winds and calms again set in, followed by south-east and east trades till October. The currents round the island changed with the changing of the trades, and this change was marked by the movement of an immense mass of sand forming the west beach. From the beginning of March the sand went on accumulating till the beginning of October, forming a beach 120 feet wide, 9 feet high, and a mile long. When the sun crossed the zenith the sand began to move to the south, and all that the waves could reach was removed and carried to the south beach; and the whole of this sand was washed back when the sun again had crossed the zenith going north.

GEOGRAPHICAL NOTES

It is stated that Col. Prjevalsky and his party are prisoners in the hands of the Chinese, who, it will be remembered, prevented him from proceeding to Lhassa.

The *New York Herald* publishes a telegram from St. John's, Newfoundland, stating that the steamer *Gulnare*, conveying Howgate's expedition to Lady Franklin Bay, has been towed into St. John's with her machinery disabled. The message adds that it is thought probable that she will be sufficiently repaired to proceed north in about a fortnight.

News from the Azores states that a disturbance of the earth has occurred in the island of St. George, resulting in the formation of another small island of about 18,000 square yards, and distant 600 yards from the shore.

An Arctic Exhibition has been opened at the Alexandra Palace, in which a great variety of objects, pictures, photographs, and other things connected with Arctic exploration are displayed. The collection is both interesting and instructive, and is well worth a visit, whatever we may think of Commander Cheyne's scheme, in connection with which the exhibition is being held. Mr. Coxwell makes an experimental ascent to-day at the Palace in connection with Commander Cheyne's project.

In the *Archives des Sciences* for June 15, Prof. Forel describes researches on the temperature of Lake Leman and other fresh-water lakes. *Inter alia*, it appears that the heat penetrates very rapidly into the 50 or 100 metres next the surface (in Lake Leman) and very slowly in the deeper layers. The temperature proved to be variable even at the extreme depth of 335 m. and the degree of variation showed that depth was still far from the depth where variability ceases. Heat penetrates more deeply into Lake Leman than into Lake Thun; the isotherms descend on an average 24 m. deeper. By January 15, 1880, Lake Leman is considered to have expended all the heat put in reserve during the summer of 1879. (This point was not reached in 1879 till February 7.)

No. 87 of the *Zeitschrift* of the Berlin Geographical Society has a long and important article by G. Harting on the formation of valleys. K. Himly gives an interesting account of the "Si Yü Shui Tao Ki," a Chinese work, published in 1824, on the hydrography of Central Asia. There are two articles on South America: one by Max Beschoren, on the forest region of the Rio Uruguay in the Brazilian province of Rio Grande do Sul, and the other by Arthur Werthemann, on the Rivers Paranapura and Cahuapanas in the Peruvian department Amazonas. The journal of the late Erwin v. Bary in North Africa is continued. From the *Verhandlungen*, No. 6, we learn that the Swiss contemplate a survey of both coasts of the Red Sea for commercial purposes, and a list is given, based on Schlagintweit's investigations, of the greatest heights of North India and Central Asia.

The principal article in the July number of *Petermann's Mittheilungen* is on the variation in the quantity of water in the

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